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THESIS

IMPROVING TRAINING COST INFORMATION AT
THE NAVAL AVIONICS CENTER

by

Gerald Francis Burke

December 1991

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Improving Training Cost Information at
the Naval Avionics Center

by

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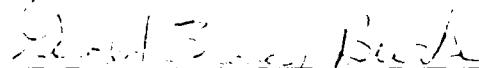
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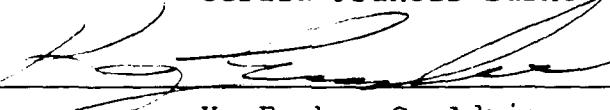
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ABSTRACT

This thesis examines training cost accounting at the Naval Avionics Center, Indianapolis, Indiana. Suggestions to improve the existing training cost accounting system are proposed. Proposed solutions utilize existing computers systems, relational data base software, and training software. Computer scientists, the Comptroller Department, and Personnel Department personnel would be key in implementing suggested changes. Division managers and senior would be the primary beneficiary of improved training cost information.

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I. INTRODUCTION

The Personnel Department, Naval Avionics Center (NAC), Indianapolis, Indiana, commissioned an assessment of its 9 million dollar training program by a team from the Naval Postgraduate School (NPS). NAC's training program is divided between the Technical & Management Development Division, and Administrative & Trades Development Division. The assembled NPS team focused on the Technical & Management Development Division's training for scientists and engineers. Although the initial intent of this thesis was to provide a cost benefit analysis of scientist and engineer training, problems with the structure of the training cost accounting system prevented its execution. This thesis examines NAC's entire training cost accounting system for information availability, efficiency and current records processing.

A. OBJECTIVE OF THE RESEARCH

The evaluation of the NAC training cost accounting information system was undertaken to provide improved accounting information to NAC management at minimal cost. Senior NAC management can use the improved cost information to evaluate return on investment from specific training. Training is approximately three percent of NAC's total budget

of 280 million. During the present defense budget erosion, NAC management is evaluating expenditures such as training.

B. ORGANIZATION OF STUDY

The following summarizes succeeding chapters:

- Chapter II, Background, highlights cost accounting problems that affect training accounting at NAC. Most large companies evaluate their cost accounting systems every few years to keep them responsive to management needs. Currently, NAC also needs to evaluate its training cost accounting system.

- Chapter III, Research Approach, addresses the methods used in accomplishing the research.

- Chapter IV, Existing System and the Problem, examines the problems discovered within the training cost accounting system.

- Chapter V, Proposed Solutions and Conclusions, presents potential solutions to the cost accounting system. Final summary, conclusions, and recommendations are presented.

II. BACKGROUND

A. CORPORATE COST ACCOUNTING PROCEDURES

Most major corporations maintain two types of accounting systems. One system presents fairly the firm's financial position based on generally accepted accounting principles (GAAP) applied on a consistent basis. The primary customers of this accounting system are stockholders, potential investors, banks, government agencies etc. (entities external to the firm). The information contained in the financial reports prepared in accordance with GAAP, though important, are not designed to provide specific information for cost management. To fill this information void, most firms have an internal cost accounting system that responds to the needs of management.

The Naval Avionics Center is similar to a private firm in that the need exists for both internal and external reporting. Occasionally internal and external reporting is performed with the same accounting systems and documents. However, with private firms, accounting systems and documents designed to meet external reporting requirements may fall short of providing key management information for effective cost control. Internal cost accounting systems, if not kept

current, also can fall short of properly reporting key information. (Cooper, 1989)

B. NAC COST ACCOUNTING PROCEDURES

This thesis focuses exclusively on training cost accounting. NAC has one official system for training cost accounting and reporting. The Comptroller Department is responsible for this system. Training cost information generated from the Comptroller Department is limited: it provides insufficient detail to help division managers with their training programs. No information is provided to levels below the division. Senior management receives no information on which training efforts are the most cost effective or efficient. This is not an unusual problem. Many companies' cost accounting systems are falling down on the job. Either incorrect product costing information is provided to managers, or managers are inundated with irrelevant cost information. (Cooper, 1989)

Kaplan explains that historically many cost accounting system designers have failed to address the informational need for operational control, resulting in a lack of feedback to production and department managers on the resources consumed during an operating period (Kaplan, 1988). Similarly, Cooper described several indicators of trouble in a cost system:

> "it's time to redesign your system if you notice that...departments have their own cost systems. When functional managers have

completely lost faith in the official cost system, they may develop systems of their own. Personal computers make it fairly easy to do. The design engineers in an electronics company didn't trust the numbers the cost system produced....The engineering department responded by developing its own system for costing. The department ignored the official system and used its private system." (Cooper, p.78, 1989)

C. CURRENT NAC COST ACCOUNTING LIMITATIONS

One strong indication that NAC's current training cost system is lacking is the additional in-house data bases that have been established. This phenomenon is happening at NAC in two ways in the training area. The Personnel Department is using the well known "off the shelf" Registrar/Historian relational data base software on a micro computer network for training management. Also, the division managers (many of whom are engineers) are running their own internal training cost accounting system to keep them current on the status of their training expenditures against what is budgeted. This is not necessarily all bad. There may be opportunities to capitalize on this phenomenon.

The Personnel Department's Registrar/Historian system is a significant technological improvement over previous manual methods of gathering and processing training data. If this additional capability could be incorporated into the training

cost accounting system, management information could be significantly improved. Cooper goes on to point out that:

> "Your system may be obsolete if you've experienced....technological improvements. Systems can become obsolete if they fail to take advantage of technical improvements that permit more efficient data gathering and analysis. The introduction of a computerized, production floor scheduling, for example, captures considerable more information about the products. This information can go into the cost system at virtually no cost."
> (Cooper, p.82, 1989)

In NAC's training cost case, it is not computerized production floor scheduling, rather it is, computerized training scheduling that "captures considerable more information" that "can go into the cost system at virtually no cost." (Cooper, p.82, 1989)

It is important to remember that symptoms are just indicators of a possible problem. As Cooper states:

> "The mere presence of symptoms doesn't mean the cost system is obsolete...[But they] provide more clues to whether your system needs fixing. Checking for symptoms and looking for changes that may have caused them gives a good indication of the effectiveness of your current system. If you find no symptoms, the system is doing fine. If you observe several symptoms and know what probably caused them, it's time for a redesign." (Cooper, p.82, 1989)

NAC's training cost system is in need of a redesign. It has not kept pace with the information available or the information needs of division and higher managers. This

thesis would have never existed if there wasn't a mandate from upper management "to get some kind of a handle on what they are getting for their training dollar." The need to redesign the training cost system, or any cost system is again, not unusual. Cooper reminds us that:

> "A cost system, with modifications along the way, should last about a decade. But at some point, you can no longer patch up and add on to the system. Companies may not want to face up to the fact that their cost systems need to be redesigned, but if they don't. they may face far more severe consequences. A business that doesn't know what its products really cost won't be in business for long." (Cooper, p.82, 1989)

Revising cost systems is therefore expected over time and can be expected to happen more often during periods of great change. The current squeeze on Department of Defense dollars requires careful management of the remaining scarce funds. As Cooper states:

> "Remember that because conditions keep changing, managers should evaluate their systems every few years. They don't necessarily have to design a new system that often. Before a company plunges into redesign it should be sure to analyze the investment. The potential savings-the difference between the total costs of the existing system and the total cost of a new one - should exceed the cost of developing and implementing the new one." (Cooper, p.82, 1989)

Therefore, it is reasonable to look into improving the internal training cost accounting system at NAC. Any proposed

changes will have to be weighed against the cost of implementation.

But why expend effort on the cost accounting system for training? After all, at three percent training is a relatively small amount of the total NAC budget. First, the taxpayers expect NAC to spend public money responsibly. Second, NAC should be interested in controlling training costs because it is an overhead cost which can be managed. (Ames and Hlavacek, p.140, 1990) Third, technology is making the management of overhead costs easier. By merging training data already available at NAC, systems can pass "large volumes of electronic data precisely, instantaneously, and relatively cheaply." (Konsynski and McFarlan, p.114, 1990)

III. RESEARCH APPROACH

A. INTRODUCTION

Limitations in the current use of the two training cost data bases, Registrar/Historian and the official cost records from the Comptroller Department, were an obstacle in execution of the original thesis concept. The difficulty of extracting key cost data in a usable form presents significant problems. A key factor is the lack of detail available in the Comptroller Department's cost accounting system.

B. THE ORIGINAL TRAINING PROJECT RESEARCH EFFORT

The total research project, for the Naval Avionics Center, is divided into several parts one of which is a cost benefit/cost effective analysis. NAC Management wants to estimate the return on investment (ROI) of a training budget in excess of 9 million dollars. NAC management realized the difficulty of tying the hard costs of time, obligations, and outlays to the softer and less predictable training benefits expected in scientific and engineering output. Yet, some kind of analysis is needed no matter how difficult it is to measure the benefits. The cost benefit/cost effectiveness analysis began with this guidance.

Accurate cost data are essential to identify the most cost effective NAC scientist and engineer training efforts. Once

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accurate cost data is obtained, they can be matched with the various courses and programs within the training program, and cost calculations made. Interviews with senior NAC managers were conducted to determine the most valuable courses. Senior managers at NAC (civil service GM 13-15) were interviewed using an interview outline developed with Professor Crawford. The interview results were compared to the cost data to access the cost effectiveness of various courses and training programs. During the interviews the topic of problems with the current cost accounting system came up repeatedly. One consistent concern was training cost reconciliation. Examination of this concern is discussed below.

C. EXAMINING THE COST ACCOUNTING SYSTEM FOR TRAINING

1. General

An understanding of the accounting system was essential to its assessment. Accomplishing a cost benefit/cost effectiveness analysis required detailed accounting data. Determining the operating details of the Personnel Department's Registrar/Historian training data base was the obvious first step because it was the most accessible pool of training cost data and understanding the system would allow better utilization of the data base. Registrar/Historian has been in use by the Training Department for approximately two years. As currently employed, it provides full disclosure of any individual's NAC supported

training, but does not generate macro level training reports such as the total costs and attendees for a particular course.

Currently, the Historian software in the Personnel Department is not being used to its full potential. Straight out of the box, Historian provides excellent individual training records. But obtaining training data on any particular population in the data base entails additional programming. A limitation encountered with developing in house Historian programs is the limitation to sort only on one item. Historian will sort on two items, however, the output from a two item sort is not readily understandable. Single item Historian sorts have been much more successful. Training analysis reports were developed which displayed: which training contractors are used most often, how much training is accomplished by activity code (administrative, technical, scientific, management, other), and how much training each occupational series (electrical engineers, mechanical engineers, secretaries, lathe operators, etc.) receives.

Additional information was gathered by generating reports from the Historian system using user developed programs. At the time of the initial examination few user developed programs for Historian existed. Subsequent development of user programs allowed extraction of additional information.

The Historian data base is so large (almost 400 megabytes), that an initial program on the computer network

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takes as long as 24 hours to process simple programs. Program corrections, if necessary, only extend processing time. Without strong support from management, the Historian system operator lacks the time to develop additional reports. Over three days, experimentation with some macro-level training reports provided high-level information from the Historian data base. The NPS training team used the generated demographic data to good benefit. NAC staff does not ordinarily generate much of this kind of information although they could.

To validate the cost benefit/cost effectiveness analyses, any cost data obtained through the Personnel Department's Historian data base required reconciliation with the Comptroller Department's official cost figures. This necessitated following the accounts payable audit trail from the receipt of the training contractor's bill by the development divisions of the Personnel Department through the payment and recording process by the Comptroller Department.

2. The Accounts Payable Process For Training

The accounts payable process begins with bills (invoices) from training contractors arriving at the Personnel Department. The training division that contracted for the training also prepares the initial payment documents. These two development divisions divide the invoices between eight clerks (four in each division). Packages are then prepared

for payment by the Comptroller Department. Walking through the accounting process step by step required examination of the Comptroller Department processes.

The Comptroller Department uses a Navy accounting system to pay for and record training costs, while the NAC Training Department uses the Historian Data Base to track who had training, who provided the training, and where the training was provided. There are timing differences and reconciliation problems between the two systems. Ultimately, the Navy accounting system used by the Comptroller Department, which is the official accounting system for both for internal and external reporting, is used to pay the bills.

When the training invoice packages arrive at the Comptroller Department the cost center codes and amount totals on the invoices are keypunched into a batch computer system, and the training contractor is paid. Training costs are allocated among various divisions within NAC based on two sources: the cost center codes and the individual employee time card hours charged to training. The Comptroller Department generates its standard monthly reports and the invoices are then filed.

The training cost information necessary to execute a cost effectiveness analysis was not available in the Comptroller Department's routinely produced reports. Cost Center Statements produce total training costs in three categories: labor costs, training costs, and travel costs.

The reports do not detail which courses or which employees are included in these totals. Obtaining additional training information from the Comptroller Department, requires manual examination of the filed invoices.

Manual extraction of data is inefficient; automated extraction is not available. Referral to the computer programmer in the comptroller department resulted in referral to the Accounts Payable Computer Scientist, code 724, Finance and Engineering Information Systems Division, in the Technical and Operational Support Department.

NAC's accounts payable system expert is the Accounts Payable Computer Scientist. Duties of that individual include supervision of VAX Computer processing of the daily tapes containing the accounts payable payment batch files. Included in these batch files are the training invoices. This computer scientist explained how the system processed the training invoices for payment. The Accounts Payable Computer Scientist was also familiar with the Personnel Department's Registrar/Historian program although another computer scientist, located in the next cubical, supervised that system.

The interview with the computer scientist in charge of the Registrar/Historian System completed the training information loop. As the Personnel Department's point of contact for all Registrar/Historian data base problems and

applications, one of this computer scientist's jobs is implementation of major system changes.

If the data in both training systems were combined, valuable training information could be retrieved. With that training information, the cost benefit/cost effectiveness analysis could be accomplished. However, the current system division precludes this and rendered completion of the original thesis impossible. The problem of combining these two training systems provided a challenge to NAC computer scientists. According to the accounts payable computer scientist, combining the information containing in the two automated systems was achievable.

A proposal to integrate these existing training cost accounting computer systems, therefore, became the logical focus of the thesis. Once the information system is developed, a cost benefit/cost effectiveness analysis should be feasible.

IV. PROBLEMS WITH THE EXISTING SYSTEM

A. NAC TRAINING COST ACCOUNTING SYSTEM

Current NAC training cost accounting is complex and occasionally confusing. Training costs and data are currently tracked by the Comptroller Department (code 300), and the Civilian Personnel Department. The Comptroller Department allocates accumulated official training costs by division. The Civilian Personnel Department (500) tracks training through individual records and maintains an extensive data base record. The direct training costs (except employee travel expenses) are allocated to the responsible division as appropriate. The Personnel Department submits these direct training costs to the Comptroller Department. The Comptroller Department charges each division with monthly direct training expenses based on the Personnel Department's cost data. Additionally, training travel expenses, payroll and overhead are charged against respective divisions. The current system is easily understood by a walk through the training cost route. The steps are:

- Employee submits DD 1556, training request, through the chain of command for approval.

- Personnel Department evaluates approved training request, updates records and schedules class on computer data base.

- Personnel Department determines course location (on or off site) and contracts course with vendor.

- Personnel Department informs applicable division training representatives of attendees, time, location, and estimated cost per attendee.

- Division training representatives inform division managers of selected personnel and updates division records.

- Employee attends training.

- Training vendor submits invoice for payment to the Personnel Department.

- Personnel Department manually prepares an invoice package to assign the direct costs of the training to the registered divisions.

- Specific managers within the Personnel Department approve the invoice packages, which are then sent to the Comptroller Department for payment.

- Data from the invoice packages are manually entered into the Comptroller Department's computerized accounts payable system.

- Cost codes from the invoice packages are used to assign direct costs to applicable divisions.

- Employee time cards are used to allocate direct labor and overhead to applicable divisions.

- Vendor is paid.

- Division managers receive monthly update of official costs from the Comptroller Department.

- Division managers attempt to reconcile their records with the official costs, to adjust the training plan and stay within the budget.

B. DETAILED TRAINING COST SYSTEM DESCRIPTION

Significant detail underlies the steps in the training cost accounting system. Inefficiencies become more clear after closely examining each step. Using an example of a training evolution, suppose Bob Smith, an electrical engineer,

submits a request (DD Form 1556 Request, Authorization, Agreement, Certification of Training and Reimbursement) to attend a course in computer design, via his supervisor, division director, and department director.

Upon department approval, the course request is sent to the Civilian Personnel Department. Two divisions in Personnel divide the management of training responsibilities according to the NAC population they serve. The Administrative & Trades Development Division (540) handles the production workers, nontechnical support personnel, and secretarial staff. The Technical & Management Development Division (530) handles the engineers, scientists, technical support, and management personnel. The Technical & Management Development Division processes the course request loading applicable data into a computer network using the Registrar/Historian scheduling software application. His request is matched with others (if any) wishing to attend the same course.

The number of requests for enrollment and the particulars of the course determine course location. Location options are: on-site at NAC, either by an instructor or by satellite television; "downtown" through Indiana University, Purdue University, Indianapolis (IUPUI), or another local school; or another city, necessitating travel costs. Most managers contacted preferred courses taught on-site at NAC or downtown at IUPUI.

Let's assume that the course is in demand by a number of NAC's approximately 850 electrical engineers. Registrar/Historian states that there are over 30 other electrical engineers who currently would like to take the course during the same time frame. A course with this kind of demand would usually be brought on-site because it is normally less costly to bring the instruction to the students rather than the students to the vendor's location. An exception to on site instruction occurs if this course has never been attended by any NAC personnel. Then management might pay the additional travel costs for a few key engineers to attend the course off-site and evaluate it for general use by the rest of NAC's engineers.

Once the decision to schedule the course on-site is made, the NAC (Technical and Management Development Division) enters into an agreement with the vendor to provide a specified number of hours of instruction and instructional aids (e.g., books) to a specified number of students at a fixed cost plus reasonable vendor travel expenses.

An associate, from the Technical and Management Division of the Personnel Department, uses Registrar to select course attendees and subsequently notifies the division training representatives of the involved divisions of the estimated training cost. Any registration changes between divisions must be made in writing prior to the commencement of the course. The division gaining the training must agree to

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assume the cost of the training. Informal substitutions may be made but the original division listed in Registrar will be billed.

To track these estimated training costs, many division managers maintain internal bookkeeping records of budgeted costs and estimated training cost charges to date. These training cost records are kept in log books, on Lotus 1-2-3 computer spread sheets, or various other internally developed systems. The division managers may maintain these records or delegate the responsibility to the division training representatives.

The contractor submits a bill to the Personnel Department, Technical and Management Development Division for the agreed upon costs of instruction, materials, and travel costs. The Technical and Management Development Division tracks only the cost of instruction and materials in Historian. The vendor travel costs are included in the direct cost of instruction when they are entered into Historian.

Then the cost of materials and instruction are prorated to the divisions of the registered personnel. This is currently accomplished by hand, even though this information is now available in Historian. One of the delays in the payment cycle is the manual labor of creating the invoice packages for approval and forwarding them to the Comptroller Department. The extra work from the manual extraction of data from Historian causes an average two-week delay in payments.

Automation could provide labor savings of approximately $20,000 per year. This is based on the compensation of two computer scientists for one month and an eight percent annual labor savings for eight training clerks.

The cost for all division personnel scheduled in Registrar/Historian to attend the course is billed to the division. The current Comptroller Department accounting system only tracks costs as far down as the division level. The division is assigned the cost regardless of whether or not its division employees attend because the cost of instruction (plus travel expenses) is fixed by contract. These costs are allocated to the divisions which requested and were provided the training opportunity by the Personnel Department's development divisions. NAC incurs the training cost whether or not the students attend and so does the responsible division.

The Personnel Department training clerk has prepared the invoice package. The responsible development division manager in the Personnel Department reviews the invoice package prior to submission to the Comptroller Department. This provides the main internal control in the system. Once either Personnel Department development division managers signs the invoice package, the packages are forwarded to the Comptroller Department where payment is automatic.

The invoice packages are delivered to the Comptroller Department where costs are footed and cross footed for

accuracy and manually reentered into the Comptroller Department's computer. Since the course information is not reflected in the Comptroller Department's computer billing code, the course information cannot be reflected in any of the computer generated reports. The course information is filed at the Comptroller Department once the division, account (billing code), and amount are keypunched. The divisions are charged for training costs based on keypunched data. The contractor is then paid for the services rendered.

The only additional training input to the Comptroller Department is the engineer's weekly labor distribution card. From this time card, his pay is allocated to training based on the number of hours recorded. So if Bob Smith spent 8 hours this week in training, eight hours of his base pay times a multiplier for other benefits would be entered into the cost of his division's accomplished training.

Every month, the division manager receives a training "bank statement" from the Comptroller Department which reports the division's training account balance. It is not really a "bank statement" rather it is three line items which appear monthly on the division's Yearly Cost Center Statement. However, conceptually, these three line items work just like a "bank statement":

• Training - Production Expense - Labor

• Training - Production Expense - Other

• Travel - Training - Production Expense - Other

"Training - Production Expense - Labor" is the traceable cost of employee time that was spent in training. "Training - Production Expense - Other" is the directly traceable costs of "hard" training dollars paid to contractors for training opportunities for the division. "Hard dollars" are actual payments by NAC to outside parties. "Travel - Training - Production Expense - Other" is the direct travel costs of division employees who attend training outside the greater Indianapolis area.

The manager must then reconcile his training register or "checkbook balance" with the Comptroller Department's training "bank statement." Timing differences averaging 2-3 weeks are normally reflected in the balances of the two statements. It is extremely unlikely that the two statements will have the same balances.

C. TRAINING COST SYSTEM WEAKNESSES

Having stepped through the typical training evolution at NAC, three weaknesses of the system become clear.

- Gaps in computer automation
- Actual vs budgeted cost reconciliation problems
- Poor training cost information

1. Gaps in Automation

The development divisions prorate the cost of materials and instruction to the appropriate divisions based on course enrollment. Although this information is presently

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available in Historian, the process is accomplished manually. The manual labor of creating the invoice packages and forwarding them to the Comptroller Department delays the payment cycle by two weeks. Use of available automation could provide labor savings of approximately $20,000 per year.

2. Reconciliation Problems

By analogy, when an individual reconciles a personal checking account register and the monthly bank statement, all outstanding checks are subtracted from the register balance. This is possible because each check is individually identified on both the bank statement and in the checkbook. Unfortunately, the division's training costs are not so easily reconciled. Although the division manager may have taken great care in accounting for training costs by individual and by training evolution in the division's "checkbook" training register, the "bank statement" received from the Comptroller Department has only totals for training costs, wages, and travel costs. Specific courses and individuals that are being charged to the division are not identified; it is not possible for the manager to balance the division's training "check book." Since the manager must work under the constraints of the division's training budget, this is somewhat disconcerting. The division manager cannot track the progress of training charges or be certain that the training charges as shown on the "bank statement" as the division's are indeed for

that division's training. This lack of detail prevents the division manager from balancing the division's training "checkbook."

Training personnel are aware that the division managers cannot properly balance their training "checkbooks" because of the lack of detail in their monthly training "bank statement" from the Comptroller Department. To help the division managers, training personnel have developed a monthly report titled "Training History" using the Historian data base. Using the software Historian, the training staff collects and sorts all information by individual. Maintaining individual training records is a major function of Historian in addition to its accounting applications.

The Training History report presents a listing of training completed by sorting these individuals by division code for the training completed within the fiscal year. The date invoiced, if completed, is listed next to the individual employee and course. For example, it would now show that Bob Smith's recent training course was invoiced and sent to the Comptroller Department on a certain date or it would be blank indicating it had not been invoiced. However, the report does not indicate if the Comptroller Department had processed the invoice package or what training "bank statement" reflected these new costs. It would simply be an estimate of where a particular individual's billing was in the accounting system. Unfortunately, because the invoice packages are prepared

manually, this report is usually published about 15 days after the latest invoice packages have been prepared and a recently invoiced course may not be listed as invoiced on the Training History. (Invoice packages to pay the contractors normally take priority. There are costs to NAC if the payments are late; there is an incentive to speed up the process).

As implied in the above paragraph, even with the Training History report the division manager cannot accurately reconcile the training cost records with the Comptroller Department's Cost Center Statements.

3. Poor Training Cost Information

Each division is a cost center. Every cost center has a billing code. The total costs for each billing code is separately listed in the invoice packages submitted to the Comptroller Department. In the Personnel Department, there are four individuals in the Technical and Management Development Division, and four in the Administrative and Trades Development Division, who prepare training invoices for payment and allocate the costs of all training bills to the divisions at NAC. At this point the courses are still correctly identified in the invoice packages. However, the course data are not included in the billing code. Only the type of expense (training), the cost center code, and the type of cost (direct cost, productive overhead, or general and

administrative overhead) are recorded. Other pertinent course information remains in the Historian database.

Training is a major tool in the division manager's inventory to keep the engineers' professional skills current. Training is a factor in retaining quality people and provides a vehicle for their personal growth and development. Employee interest in various training programs is strong, however, the division manager must work within the constraints of the training budget. However, division managers and above also have problems in analyzing their training data. The Yearly Cost Center Statement lists cumulative costs to date, but no detail. The Training History, from the two Development Divisions, lists detail for each individual, but the information is so detailed that it is difficult to gather specific information on any particular cost object other than the individual. This is an example of what one manager called the "data rich but information poor" environment at NAC. Changing this environment, at a reasonable cost, is one way to improve training management through enhanced information availability.

The next Chapter proposes possible changes to improve the training information system and help eliminate the training cost reconciliation problem.

V. PROPOSED SOLUTIONS AND CONCLUSIONS

Significant benefits of the proposed cost accounting procedural changes include improved training cost information, reconciliation of actual and budget training costs, and reduction of labor costs. Upon implementation of the proposed changes, a cost benefit analysis could be conducted.

A. CURRENT SYSTEM WEAKNESSES

Two separate computer systems currently comprise the training cost accounting system: the Personnel Department's Registrar/Historian, and the Comptroller Department's Accounts Payable System. Both systems are linked to the VAX computer. Two separate relational data base software systems are available on the VAX: RDB and Oracle. The Personnel Department's Registrar/Historian uses RDB while the Comptroller Department's Account Payable System uses Oracle.

Currently, Historian tracks training for all NAC employees. Periodically updated personnel records, originally entered in the RDB data base, are downloaded to the Historian System. Conversely, training information is uploaded from Historian into the RDB data base for external governmental agencies reports, (see Figure 1 below).

CURRENT TRAINING COST ACCOUNTING SYSTEM
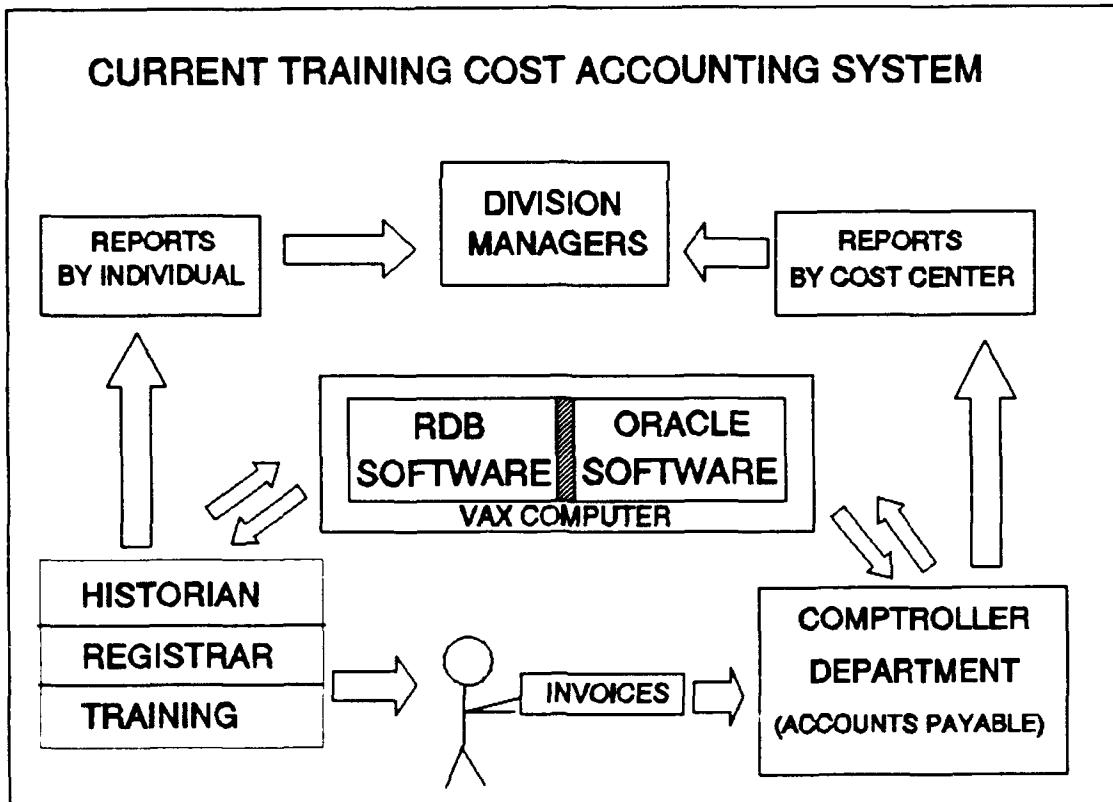
Figure 1

B. PROPOSED CHANGES TO TRAINING COST SYSTEM

The two relational data base software packages resulted from separate purchases, by different VAX users, in successive years. If the VAX used a single relational data base software system, tying Registrar/Historian into the accounts payable system would be much simpler. Information transfer from RDB to Oracle and vice versa is possible if commonality is established. Three clear benefits of establishing commonality are: elimination of the training cost system reconciliation problem; decreased manual labor costing preparing and imputing invoice packages; and increased information exchange.

RECOMMENDED TRAINING COST ACCOUNTING SYSTEM
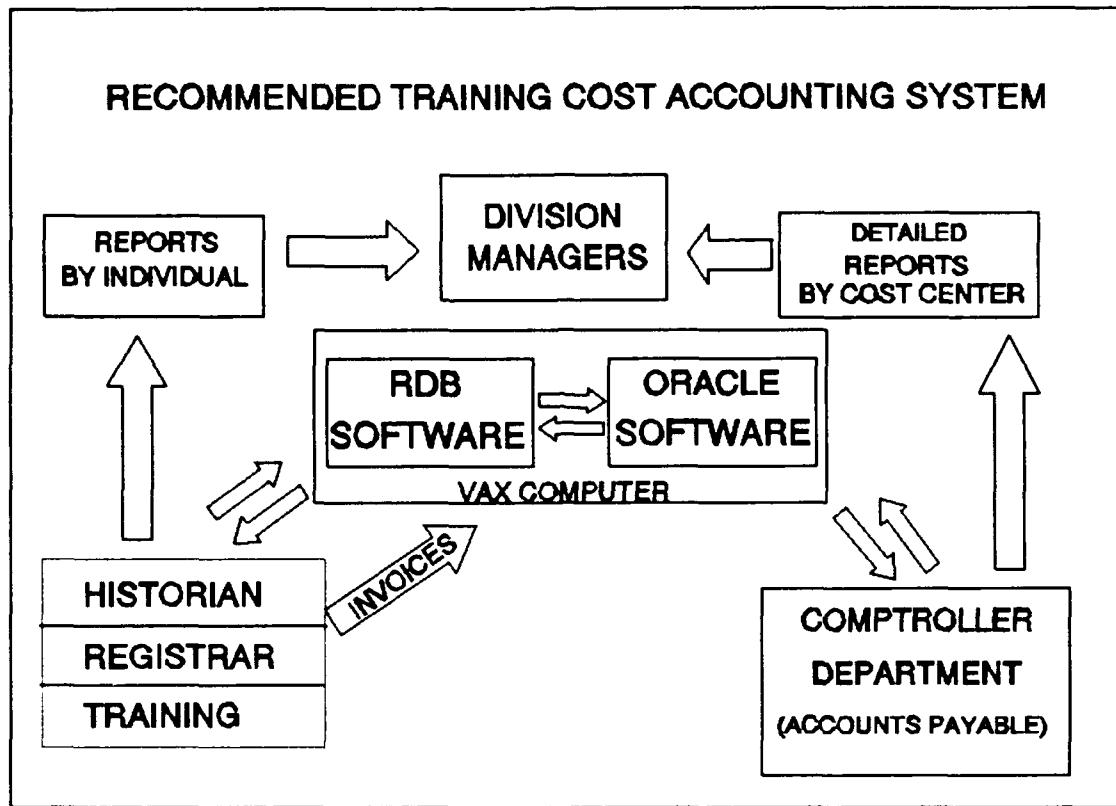
Figure 2

Programming a common basis for information exchange is the key to improving the system.

Establishing commonality so information can be exchanged between the currently used relational data base systems of RDB and Oracle is an essential step. Another option available to facilitate information exchange is to establish RDB, Oracle, or another system as the sole relational data base within the VAX. However, the suggested modifications of the existing training cost accounting system should provide improved training cost information without disturbing other users with vested interests in continuing to use RDB and Oracle.

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C. BENEFITS OF PROPOSED COST SYSTEM CHANGES

This programming effort to inter-link RDB and Oracle involves some risk, but is achievable according to the Accounts Payable Computer Scientist. The risk revolves around the possibility that the computer scientists will not be able to establish commonality between RDB and Oracle where a relational data base search can be used. A rough estimate of the labor and training costs of developing a way to transfer information between RDB and Oracle is less than $10,000. The estimated labor savings is over $20,000 a year if the training invoice process can be automated. This provides a net annual savings of $10,000 the first year and $20,000 annually thereafter.

With an automated information transfer, invoice package preparation would be automated, and much of the efforts of the eight training clerks would be saved. Also, the Comptroller Department would not have to reenter the information into Oracle, if information currently in the RDB data base were downloaded to the Oracle software. Transferring complete Historian information to Oracle would result in error reduction and increased invoice detail. This would alleviate problems now caused by the abbreviated information available in the Comptroller's Accounts Payable System.

Since the Comptroller Department would receive more complete data, more comprehensive reports could be generated. Current reports, where necessary, could be retained while

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supplemental training cost reports could provide the details required by division managers. The division manager could then balance the training "checkbook register" because the detailed information of who and what training had been paid for and included in the cumulative training costs, the "canceled check numbers," would be reflected in the monthly training "bank statement."

Another benefit of an automated invoice package process, in addition to labor savings, is increased speed of paying contractors. The automated transfer of information from the development divisions to the Comptroller D rtment (Accounts Payable) decreases invoice processing time and thereby increases the speed of contractor payments. Current laws protect contractors from slow government payment. Interest penalties encourage prompt payment, and prompt payment generates goodwill with contractors.

D. FOLLOW-ON TRAINING COST/BENEFIT ANALYSIS

Increased information exchange is the natural result of tying Historian to both sides of the VAX. Managers at all levels of NAC would have the ability to request and obtain increased detail of where and how their training dollar is being spent. The data base powers of the Historian program could be linked to the official Comptroller Department reports to exploit the information potential of the systems.

Ultimately the managers, division or higher, need to ask the necessary questions in order to develop Historian programs to provide useful information for training management within the system parameters. If the management of the Naval Avionics Center intends to obtain more useful training cost information, changing the training cost accounting system is an inexpensive way to achieve that end.

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